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(A proposal to determine the kinds and levels of recreational services needed to meet the demands of and increase participation of residents of a recreation and park district.)

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STATEMENT OF THE PROBLEM

A fundamental problem confronting any public service agency is that of insuring that the types and levels of the various services it is providing adequately conform to the needs or demands of its clientele. Indeed, the adequacy of any service provided may be empirically defined as the relationship between its supply and demand. As expressed by Jack L. Knetsch, "the emphasis should be placed on determining and explaining the patterns of use which emerge, given the availability of opportunities and the characteristics of the using population."[1] The nature of the relationship between the supply and demand for recreation is complex and evasive. However, simplistically stated it may be said that should the supply of a particular recreation activity be equivalent to, or in excess of, the demand for said activity, then the current demand may be considered satisfied. Thus within the scope of this project three questions emerge as central themes. First, are existing recreation programs being provided at levels designed to adequately satisfy the community's demand for them? Second, how long into the future may we realistically expect present service levels to continue satisfying demand? And third, is the present mix of recreation opportunities ignoring any areas of manifest need?

The existence of a discontinuity between program activity opportunity and participation rates recently surfaced within the operations of the North Bakersfield Recreation and Park District. The existence of the problem is implied by the fact that even though the District population and program budget, staff, and facilities have all continued to increase, a complementary increase in resident participation has failed to reveal itself. The converse is in fact the case in that the annual rate of increase in participation is falling

1. Jack L. Knetsch, "Assessing the Demand for Outdoor Recreation," The Journal of Leisure Research, Vol. 1, No. 1 (Winter, 1969), p. 87.

in the face of a mushrooming population base. Operating on the assumption that participation rates are to some degree directly related to population characteristics, as noted in the quotation of Knetsch earlier, the implication clearly is that the District is failing to provide services which optimally satisfy community demand. Thus the quandry: In what manner can the supply of recreation opportunity be reconstituted so as to mesh more closely with the demand and thereby increase resident participation rates?

THE THEORETICAL MODEL

A great deal of investigative research has been conducted in the attempt to ferret out the most reliable techniques for estimating recreation demand and supply. The research thus far conducted has produced an ongoing debate and much confusion. However, from this discourse one particular type of methodology and set of independent variables has emerged as reliable indicators and predictors of the demand side of the relationship. The model being eluded to has come to be called the population-specific recreation forecasting model.[2] The validity of the model as regards the reliability of its forecasts has been attested to in a myriad of studies. In fact, a study conducted by the British Travel Association specifically cited this model and the independent variables which it attributes causative significance as being of particularly enhanced value in determining the type, volumn, and source of recreation participation.[3]

The population-specific recreation forecasting model attributes primary causative significance to seven socio-economic input variables. Included among these population characteristics are sex, age, ethnicity, income, education,

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2. Charles J. Cicchetti, Forecasting Recreation In the United States, Lexington, Massachusetts (D.C. Heath and Company), 1973, p.12.

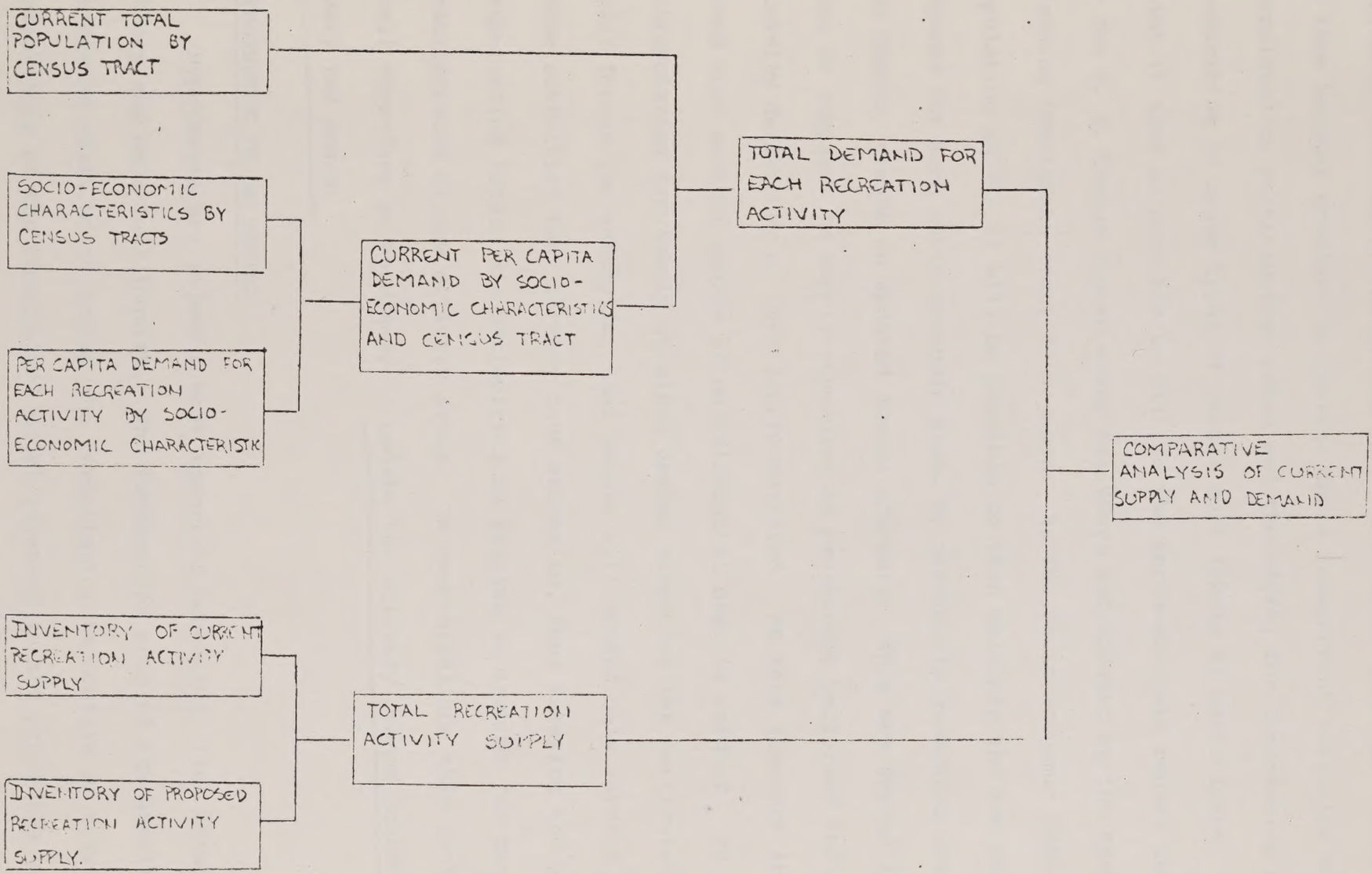
3. Thomas L. Burton, (ed.), Recreation Research and Planning: A Symposium, London (George Allen and Unwin, Ltd.), 1970. p.19.

occupation, and location of residence (figuratively expressed the model would appear as indicated by figure 1). In applying this model, given the basic raw data, the initial concern is the current per capita demand for specific recreation activities. Current per capita demand is computed as the arithmatic mean of the per capita participation days or portion of such days of each socio-economic group as weighted by the aggregate number of people in each group living within a specific census tract. Secondly, total recreation demand, also expressed as participation days, for each census tract is computed by multiplying the arithmatic mean of the per capita demand by the total number of residents in a particular census tract. It should be noted that the primary shortcoming of this methodology is that it fails to take directly into account the demand for recreation and its relationship to the benefits to be gained from participation. Also, the methodology fails to fully account for the potential substitutibility among various recreation demands.

On the supply side of the relationship the model again shall compute results in terms of participation days in order to facilitate comparison with the demand schedule generated. To compute total recreation supply by activity it is necessary to first compute the total number of participants that a particular activity is currently capable of accommodating. This figure is then multiplied by the total number of hours during which the program activity is operated. To convert this figure into participation days it is then necessary to divide by twenty-four. Comparative analysis may now be undertaken for each activity area.

Up to this point the model has only dealt with the current supply and demand schedules. In order to create a reliable forecast of future estimates of participation in various activities it becomes necessary to discern precisely which of the socio-economic independent variables is most highly correlated to participation rates for said activities. Once the level of significance and

POPULATION- SPECIFIC RECREATION FORECASTING MODEL



NOTE: ALL FIGURES EXPRESSED IN PARTICIPATION DAYS

strength of the association are computed for the North Bakersfield area in particular (thus giving a population-specific measure of those socio-economic variables most highly correlated to participation rates in specified activities) it then becomes possible to isolate those independent variables most strongly correlated to participation rates and therefore, for forecasting purposes, most predicitive of those types of people most likely to participate. From this point it then is possible to utilize the socio-economic census data generated by the U. S. Census Bureau every ten years and updated by the Kern County Planning Commission every five years. As the socio-economic make-up of the population shifts it will be possible to then multiply the new population figures for each socio-economic group by previously generated demand schedules and thereby create an updated demand schedule. This new demand schedule may then be compared to supply schedules as previously performed and areas of activity deficiency or over-supply revealed. At this juncture it should be noted that another source of metholodogical bias is evident. By simply extrapolating previously obtained demand schedules for particular activities the model forces the assumption that people will demand only varying quantities of those activities they already have access to, thus creating the potential for perpetuating future discontinuities by failing to account for the demand for unanticipated or new activity areas. To counterbalance this contingency it shall therefore be necessary to update the activity demand schedule at least every ten years.

HYPOTHESES TO BE TESTED

Hypotheses are indeed a most important conceptual link between basic theory and empirical inquiry. The fundamental role of the hypotheses herein generated shall be to assist the investigator to confirm or disconfirm the reliability of the theoretical model advanced in the preceding section. Without

such a tool the investigation would lack direction, would not be conducive to statistical testing procedures, and would fail to provide the researcher with variables from which to deduce empirical manifestations or operationalizations implied by the hypotheses. In order to avoid such circumstances the hypotheses, though implied by the model, shall be clearly and unambigously stated.

The existence of the basic relationship between recreation activity supply and demand is founded on the overarching hypothesis that people, regardless of their socio-economic make-up, have an inherent need or desire to engage in recreation of various sorts, and an as yet unspecified demand schedule exists for specified activities irrespective of the supply or availability of opportunity to engage in said activity. As should be evident, this hypothesis is not one of relationship or covariation; rather it is one of existence. In other words, does a demand for activity X manifest itself within the District's clientele group.

For purposes of forecasting future demand as described earlier it shall be necessary, once the above hypothesis has been substantiated or rejected, to test a number of relational and covariation hypotheses specifying the relationship of socio-economic characteristics to the demand for particular activities. The following shall be tested:

1. The sex of a potential participant has less of an impact on the levels of participation than on the types of activities in which one partakes.
2. Family size has less of an impact on the levels of participation than on the types of activities in which a family partakes.
3. The higher the household income the more likely a person is to engage in all recreation activities and particularly those which are fee based.
4. The occupation of the head of household is related to both the type and level of recreation participation.
5. The higher the education the more likely a person is to engage in all recreation activities.

6. The age of a person has more of an impact on the type of participation than on the level of participation.

7. The ethnic background of a person has an impact on both the type and level of participation.

DATA NEEDS, COLLECTION METHODOLOGY, AND SAMPLING TECHNIQUE

The input data requirements of the prescribed model are rather extensive. To be included among the input data are the following: current and forecasted population figures by each census tract; current and forecasted socio-economic characteristics of the population; recreation preferences of District residents; the amount of time each individual spends on preferred activities; the time of year during which the individual engages in said activities; an exhaustive inventory of the total amount and type of recreation opportunity presently provided; and a three year projection of the amount and type of activities to be provided.

The data collection methodology to be utilized for this project shall be the sample survey administered by a well-trained interviewer in the presence of the respondent. There are a number of considerations which lead to such a choice. First, face-to-face interviews are historically valid in terms of maximizing the percentage of completed interviews. Second, by creating a person-to-person exchange the probability of increasing the respondents proclivity to provide complete and accurate answers is enhanced. Third, greater flexibility is created by the personal interview for clarifying vaguenesses or ambiguities in questions and answers. And fourth, such an interview is not highly impacted by circumstances of the respondent (i.e. literacy, education, sight, etc.).

In terms of the interview schedule design, use shall be made of both open and closed response questions. Initially, the interview schedule is to incorporate primarily open response questions. Such questions shall be used during the pretest phase of the project to evaluate the quality of the

interview and to generate some preliminary data from which more appropriate and encompassing closed response questions can be developed. With such data in hand a content analysis may then be undertaken to discern the most advantageous closed response categories for the sample population as a whole. In creating the final interview schedule both types of questions shall again be incorporated. The rational here is to use the random probe technique for checking the validity of the closed response questions.[4] The random probe technique is a process whereby each closed response question is followed immediately after the respondent's answer with a neutral probe designed to have the individual elaborate upon his previous answer. The recorded comments may then be compared with the answer to the closed response question to reveal to what degree the comments are predictive of the closed choice. Thus, by incorporating the techniques of combining the advantages of both open and closed response question, the pretest procedure, and the random probe, it is believed that greater depth will be instilled in the data gathered.

In regards to sampling technique, this study is to make use of a special form of probability sampling known as simple random sampling. The fundamental prerequisite of simple random sampling (SRS) is that each element or unit of the project population is clearly and unambiguously identified. To adhere to this prerequisite use shall be made of an exhaustive list of the addresses of every household within the confines of the District's jurisdiction. Said list shall be obtained through a local postal service known as the Advertisers Addressing Service. Once the list is obtained each residence shall be assigned a number. Selection of the sample shall proceed via the application of a table of random numbers without replacement. A total

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4. Howard Schuman, "The Random Probe: A Technique for Evaluating the Validity of Closed Response Questions, "American Sociological Review, Vol. 31 (1966) pp. 218-222.

sample size of 1,000 residential households shall be used. For purposes of insuring the integrity of the conclusions to be drawn on the basis of this sample (i.e. the sample's representativeness of the total population) a confidence level of .05 will be required. At this particular level it shall be necessary to utilize a confidence interval of approximately two standard errors around a given mean. Because of temporal and budgetary constraints it is impractical to carry out repeated samples to determine the needed standard deviation; therefore, it shall be necessary to use the sample itself.

STATISTICAL METHODOLOGY

In order to discern which of the previously advanced independent variables is most highly correlated to the demand for a particular activity it shall be necessary to perform at least three statistical procedures on the crosstabulations of the socio-economic variables by the demand for a particular activity. The three procedures to be utilized here are a test of significance, a measure of association, and a measure of correlation. However, before proceeding with the selection of the appropriate statistical tests it is first necessary to determine: 1) the level of the data to be generated: 2) the size of the tables to be studied; and 3) whether or not the hypotheses are directional (i.e. symmetric or asymmetric). In order to avoid the tenuous assumption frequently made in social research that the variables being dealt with are normally distributed and interval level (thus warranting the use of the more powerful parametric tests), this study shall take the more conservative path of utilizing nonparametric tests. The level of the data to be utilized is clearly ordinal as a result of the fact that the responses shall reflect an individual's attitudinal preferences. The size of the tables to be studied are in all cases larger than 2 x 2. And finally, the hypotheses advanced earlier are obviously asymmetric in that they attribute causative

significance to the seven socio-economic independent variables.

Initially concern shall be toward generating aggregate descriptive statistics for each individual variable. Such descriptive statistics shall include percentage frequency distributions, means and medians (contingent on the level of a particular variable), ranges, skewness, standard deviations, standard erors, and the variance. Such statistics will give a clear indication of the intravariable characteristics. Following the descriptive data shall come the creation of two-way frequency tables (crosstabulations) between the types and levels of recreation activity demand and the seven socio-economic variables as conceptualized in the hypotheses advanced. In analyzing the crosstabulations, the chi-square test of significance shall be utilized in assessing whether or not the relationships revealed have occurred by chance alone. For purposes of this project only those crosstabulations which are significant to the .05 level or higher shall be acceptable for further analysis and manipulation. To those relational crosstabulations which adhere to this minimum criterion shall be applied a measure of association designed to clarify the strength of the indicated relationship. In this project, a probabilistic measure of association shall be incorporated because of the desire to specifically measure association, not significance as do chi-square-based measures of association. Also, in those instances in which the measure of association is strong (i.e. .5 or better) the indication would be that some measure of correlation would be appropriate. Thus, because the data is at the ordinal level and the relationships expressed are asymmetric, Somer's d probabilistic measure of association shall be used. And finally, for those relationships which adhere to the above criterion for the measure of association, Kendall's Rank Correlation statistics (TAU) for ordinal level data shall be applied. Via the sequential application of the three statistical procedures outlined above, it shall then be possible to

determine to which socio-economic variable to attribute primary causative significance. These variables may then be isolated within the population at future points in time for purposes of their predictive value as discussed earlier.

The rather large number of descriptive and correlational statistics to be generated in this project would seem to constitute a monumental enterprise. However, these statistical manipulations are not to be conducted by hand. Rather, the IBM 370 computer system housed at California State College Bakersfield shall be utilized to streamline the process in manipulating such a large number of interviews. Further, because of its ease of operation, the Statistical Package for the Social Sciences (SPSS) subsystem shall be used. Indeed, within this subsystem all of those statistical tests to be incorporated into this project have been pre-programmed. Thus, we are able to avoid the rather laborious and complicated task of programming the computer ourselves.

PLANNING AND EXECUTION SEQUENCE

Estimating the temporal parameters of a survey research project is a hazardous undertaking. The myriad of unforeseen problems which will undouhtedly arise is impossible to anticipate in its entirety. However, without fixing a strict temporal budget it is possible to delineate the logical sequence of events necessary for the successful completion of our undertaking. Said steps, sequentially listed, include:

1. Formulation of preliminary research objectives; preparation of a research design and proposal.
2. Initial discussions and negotiations with potential funding sources; entrance into final contractual agreement.
3. Meetings with necessary coordinating agencies and persons.
4. Preparation of sample design; collection of materials for drawing the sample; drawing and recording the sample; preparation of sample

components for field use.

5. Development of the tentative interview schedule.

6. Pretest of the tentative interview schedule and the sample population; application of quality control measures to sample population to insure representativeness; reconstruction of interview schedule from preliminary data.

7. Recruitment and selection of project personnel.

8. Preparation of training and orientation materials; conduct of a training and orientation workshop.

9. Field work, collection of the data.

10. Editing and coding data from the questionnaires to fortran coding statements.

11. Keypunching data and card verification.

12. Preparation of computer programs; placement of data on computer; data processing and tabulation; statistical manipulation.

13. Interpretation and analysis of derived results.

14. Preparation and publication of final report.

15. Conference and discussions with all agencies, groups, and persons sharing mutual interest in results; special presentation to financial sponsors.

16. Completion of necessary administrative and accounting records; storage of all computer program and data cards.

The above comprise the basic steps essential to completing the project. The actual temporal frame will be influenced by such factors as adverse weather, holidays, absenteeism, and other unforeseeable delays. Suffice it to say that a minimum of six months is necessary (assuming there are few kinks in the execution of each step).

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